

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

Claim 7 (currently amended): A method of producing a material for a heat dissipation substrate for mounting a semiconductor chip, comprising the steps of:

press-forming molybdenum powder having an average particle size of 2-5 μ m at a pressure of 100-200 MPa to obtain a molybdenum powder compact,

impregnating melted copper into a void between powder particles of the molybdenum powder compact in a nonoxidizing atmosphere at 1200-1300°C to obtain a composite of molybdenum and copper which contains 70-60% molybdenum in weight ratio, the balance copper, and

primary rolling the composite at a working rate of at least 60% to produce a rolled composite, the rolled composite having a coefficient of linear expansion of $8.3 \times 10^{-6}/K$ or less at 800°C which is matched with that of the semiconductor chip in a final rolling direction in one direction as a first rolling direction at a temperature of 100-300°C and at a working rate of 50% or more;

secondary rolling the composite as cold rolling in a direction intersecting with the one direction as a second rolling direction at a working rate of 50% or more after the step of primary rolling,

wherein a total working rate is 75% or more when primary rolling and secondary rolling so as to produce a rolled composite of molybdenum and copper which has an isotropic coefficient of linear expansion in the first and the second rolling direction.

Claim 8 (currently amended): A method of ~~producing a material for a semiconductor mounting heat dissipation substrate~~ as claimed in claim 7, wherein said steps of primary and secondary rolling comprises the sub-steps of primary rolling ~~are carried out in one direction at a temperature of 100-300°C and at a working rate of 50% or more, and secondary rolling carried~~

~~out as cold rolling in a direction intersecting with the one direction at a working rate of 50% or more, a total working rate being 75% or more, thereby producing a rolled composite of molybdenum and copper which has a coefficient of linear expansion of $7.2-8.3 \times 10^{-6}/K$ at $800^{\circ}C$ in the secondary rolling direction, alternating repeatedly so as to extend particles of molybdenum contained in the composite to the first and the second rolling directions and form the particles into a flat shape.~~

Claim 9 (currently amended): A method of ~~producing a material for a~~ as claimed in claim 7, further comprising the step of ~~press-forming molybdenum powder having an average particle size of $2-5 \mu m$ at a pressure of 100-200 MPa to obtain a molybdenum powder compact;~~

~~impregnating melted copper into a void between powder particles of the molybdenum powder compact in a nonoxidizing atmosphere at $1200-1300^{\circ}C$ to obtain a composite of molybdenum and copper which contains 70-60% molybdenum in weight ratio, the balance copper;~~

~~rolling the composite at a working rate of at least 60% to produce a rolled composite, the rolled composite having a coefficient of linear expansion of $8.3 \times 10^{-6}/K$ or less at $800^{\circ}C$ which is matched with that of the semiconductor chip in a final rolling direction; and~~

~~press-bonding copper plates to both surfaces of the rolled composite to obtain a substrate for a semiconductor-mounting heat dissipation substrate having a copper-clad.~~

Claim 10 (currently amended) A method of ~~producing a material for a semiconductor-mounting heat dissipation substrate~~ as claimed in claim 9, wherein said step of primary and secondary rolling the copper-molybdenum composite as an intermediate layer is carried out with the ratio of copper and molybdenum and ~~the~~ a reduction percentage controlled so that a resultant rolled composite has a coefficient of linear expansion, equal to $8.3 \times 10^{-6}/K$ or less at $400^{\circ}C$, and thereafter the step of press-bonding copper on both surfaces of the rolled composite is carried out to obtain a copper-clad rolled composite having a controlled coefficient of linear expansion of $9.0 \times 10^{-6}/K$ or less at $400^{\circ}C$.

Claim 11 (currently amended): A method of producing a material for a semiconductor mounting heat dissipation substrate as claimed in claim 9, wherein said step of rolling the copper-molybdenum composite as an intermediate layer is carried out with the ratio of copper and molybdenum and the a reduction percentage controlled so that a resultant rolled composite has a coefficient of linear expansion of $8.3 \times 10^{-6}/K$ or less at $800^{\circ}C$, and thereafter said step of press bonding copper on both surfaces of the copper-molybdenum composite is carried out to obtain a copper-clad rolled composite having a coefficient of linear expansion of $9.0 \times 10^{-6}/K$ or less at $800^{\circ}C$.

Claim 12 (currently amended): A method of producing a ceramic package, comprising :
press-forming molybdenum powder having an average particle size of $2-5\mu m$ at a pressure of 100-200 MPa to obtain a molybdenum powder compact; ;

impregnating melted copper into a void between powder particles of the molybdenum powder compact in a ~~non-oxidizing~~ nonoxidizing atmosphere at $1200-1300^{\circ}C$ to obtain a copper-molybdenum composite containing 70-60% molybdenum in weight ratio, the balance copper; ;and

primary rolling the composite at a working rate of at least 60% to produce a rolled composite having a coefficient of linear expansion of $8.3 \times 10^{-6}/K$ or less at $800^{\circ}C$ in a final rolling direction; in one direction as a first rolling direction at a temperature of $100-300^{\circ}C$ and at a working rate of 50% or more;

secondary rolling the composite as cold rolling in a direction intersecting with the one direction as a second rolling direction at a working rate of 50% or more after the step of primary rolling;

press-bonding copper plates to both surfaces of the rolled composite to obtain a copper-clad rolled composite having a coefficient of linear expansion of $9.0 \times 10^{-6}/K$ or less at $800^{\circ}C$; and

directly brazing the copper-clad rolled composite with ceramic having a metal layer affixed to a surface of the ceramic.